

[0171] The exemplary embodiments thus also encompass an apparatus that comprises a processor and a memory that includes computer program code. The memory and computer program code are configured to, with the processor, cause the apparatus at least to, when resuming data transmission/reception upon activation of a serving cell, or after a long in-device coexistence interference avoidance gap, where a valid channel quality indication result is available at the latest: (a) 4 ms after activation for transmission modes other than transmission mode 9; and (b) until the first subframe that has a channel state information reference signal available after activation +4 ms for transmission mode 9, determine whether to report to a network access node no channel quality indication value, or to report an historic channel quality indication value, or to report an out of range channel quality indication value for a certain period if any periodic channel quality indication resource is configured for the cell, or if an aperiodic channel quality indication for the cell is requested from the network access node. The memory and computer program code are further configured to, with the processor, cause the apparatus to report a valid channel quality indication if available, or to otherwise report no channel quality indication value, or to report one of the historic channel quality indication value or the out of range channel quality indication value.

[0172] It should thus be appreciated that at least some aspects of the exemplary embodiments of the inventions may be practiced in various components such as integrated circuit chips and modules, and that the exemplary embodiments of this invention may be realized in an apparatus that is embodied as an integrated circuit. The integrated circuit, or circuits, may comprise circuitry (as well as possibly firmware) for embodying at least one or more of a data processor or data processors, a digital signal processor or processors, baseband circuitry and radio frequency circuitry that are configurable so as to operate in accordance with the exemplary embodiments of this invention.

[0173] The exemplary embodiments also encompass an apparatus that comprises means, responsive to resuming data transmission/reception upon activation of a serving cell, or after a long in-device coexistence interference avoidance gap, where a valid channel quality indication result is available at the latest: (a) 4 ms after activation for transmission modes other than transmission mode 9; and (b) until the first subframe that has a channel state information reference signal available after activation +4 ms for transmission mode 9, for determining (e.g., DP 10A, memory 10B, program 10C, CQI 10E) whether to report to a network access node no channel quality indication value, or to report an historic channel quality indication value, or to report an out of range channel quality indication value for a certain period if any periodic channel quality indication resource is configured for the cell, or if an aperiodic channel quality indication for the cell is requested from the network access node. The apparatus further comprises means for reporting (e.g., DP 10A, memory 10B, program 10C, transceiver 10D, CQI 10E) a valid channel quality indication if available, otherwise reporting no channel quality indication value, or reporting one of the historic channel quality indication value or the out of range channel quality indication value.

[0174] Various modifications and adaptations to the foregoing exemplary embodiments of this invention may become apparent to those skilled in the relevant arts in view of the foregoing description, when read in conjunction with the accompanying drawings. However, any and all modifications

will still fall within the scope of the non-limiting and exemplary embodiments of this invention.

[0175] For example, while the exemplary embodiments have been described above in the context of the (UTRAN LTE-A) system, it should be appreciated that the exemplary embodiments of this invention are not limited for use with only this one particular type of wireless communication system, and that they may be used to advantage in other wireless communication systems, as well as in systems using different combination of technologies (e.g., other than or in addition to LTE cellular, LTE-A cellular, GNSS, Bluetooth and WiFi, which are discussed merely as examples and not in a limiting sense).

[0176] It should be noted that the terms “connected,” “coupled,” or any variant thereof, mean any connection or coupling, either direct or indirect, between two or more elements, and may encompass the presence of one or more intermediate elements between two elements that are “connected” or “coupled” together. The coupling or connection between the elements can be physical, logical, or a combination thereof. As employed herein two elements may be considered to be “connected” or “coupled” together by the use of one or more wires, cables and/or printed electrical connections, as well as by the use of electromagnetic energy, such as electromagnetic energy having wavelengths in the radio frequency region, the microwave region and the optical (both visible and invisible) region, as several non-limiting and non-exhaustive examples.

[0177] Further, the various names used for the described parameters, modes of operation, subframes, reports and the like (e.g., CQI report, CSI report, CSI RS, TM9, ICO, etc.) are not intended to be limiting in any respect, as these parameters, modes of operation, subframes, reports and the like may be identified by any suitable names. Further, any names assigned to various channels (e.g., PDCCCH, etc.) are not intended to be limiting in any respect, as these channels may be identified by any suitable names.

[0178] Furthermore, some of the features of the various non-limiting and exemplary embodiments of this invention may be used to advantage without the corresponding use of other features. As such, the foregoing description should be considered as merely illustrative of the principles, teachings and exemplary embodiments of this invention, and not in limitation thereof.

What is claimed is:

1. An apparatus, comprising:

at least one processor; and

at least one memory storing a computer program;

in which the at least one memory with the computer program is configured with the at least one processor to cause the apparatus to at least:

in response to resuming data transmission/reception upon activation of a serving cell, to enable carrier aggregation, reporting to a network access node an out of range report for the serving cell being activated for a certain period before a valid channel quality indication result is available if a periodic channel quality indication reporting for the serving cell is configured for the apparatus or if an aperiodic channel quality indication for the serving cell is requested from the network access node, where a minimum requirement is defined for the certain time period before the valid channel quality indication result is reported; and